

SBC claims briefly in a footnote that multi-use equipment may in fact consume more space, and concocts a single example to support its position. However, its argument fails for two reasons. SBC at 12 n.10. First, SBC's claim that multi-use equipment is often heavier and uses more power and heating, ventilation, and air conditioning ("HVAC") is unsupported and simply incorrect. Central offices are generally constructed with sufficient power, HVAC, and floor loading parameters to supply a completely full central office, and additional power and HVAC would rarely be required to accommodate multi-use equipment. *See, e.g., Cisco at 7; cf. Rhythms at 57.*

Second, SBC's example is an apples-to-watermelons comparison. The SLC Series 5 is a DLC that is capable of supporting a maximum of 192 lines. The Extended Switching Module ("EXM"), by contrast, operates as a full-featured, stand-alone remote switch that can serve up to 20,000 lines. A CLEC would be much more likely to collocate a smaller remote switch module that would serve 2000-4000 lines, and therefore a much more fair comparison would be between the smaller RSM and the multiple DLCs that it would replace. As AT&T showed in its comments, depending on the footprint served, such an RSM could actually be *smaller* (i.e., consume less floor space) than the multiple DLCs it is replacing (and in all events would easily fit within a standard collocation cage). *See AT&T at 25-26.*

Moreover, against that single example, the comments provide extensive evidence for the Commission's findings that today's integrated multi-use equipment is generally smaller than older single-use equipment.¹⁹ Indeed, the Commission itself has previously found that

¹⁹ *See, e.g., Collocation Order* ¶ 31 (finding a "technological trend towards integrated telecommunications equipment" and citing record support); *see also Local Competition Order* ¶ 581 ("[w]e recognize, however, that modern technology has tended to blur the line between switching equipment and multiplexing equipment").

technological advances are enabling equipment vendors increasingly to make equipment that integrates many functions, including, for example, the ability to integrate transmission functions (such as multiplexing) with packet switching or other advanced service functions. As Cisco explains (at 7), “advances in computer processors and miniaturization have allowed manufacturers to design and build increasingly intelligent boxes that perform more functions but take up no more space and consume less power than did their less advanced predecessors.”²⁰ Indeed, Tachion shows that “advances in integration and processing capabilities” have allowed it to create a product “that combines switching, routing, transport, digital access cross connect system (“DACS”), signaling, and service creation functionality in a single standard central office rack.” Tachion at 2.

²⁰ See also Nortel at 5 (“[S]ingle-function (interconnection only) products are unlikely to be physically smaller or consume less power than equipment that includes additional functionality . . .”); Qwest at 11 (“[T]here is no reason to conclude that newer equipment with multiple functions will require more space than older, single-function equipment . . .”); Supra Telecom at 10 (“Such multi-feature equipment may, in fact, be cheaper and smaller than older, single functional equipment.”); Supra Telecom at 14-15 (providing specific examples demonstrating that multi-function equipment CLEC seeks to collocate is smaller than prior single function equipment); Corecomm at 27 (“In 1996, for example, a typical Class 5 required hundreds of feet of floor space in a separate room, while today several modern routers or multiplexers can fit comfortably within the space of a typical 10 x 10 collocation cage.”); Corecomm at 28-29 (“At the same time, however, allowing collocation of multifunction and stand-alone telecommunications equipment would increase the occupation of ILEC central offices marginally, if at all.”); Focal at 13 (because manufacturers have been able to substantially decrease the size of such equipment, DSLAMs, ATM multiplexers and remote switching modules are all able to fit within the collocation space allocated to the CLECs.”); Focal at 14 (Multifunctional equipment “permits carriers to perform multiple tasks with one piece of technology that is smaller in size so it can easily be placed in CLEC rented collocation space.”); Tachion at 3 (“The enormous cost and space benefits of this fully integrated design will help CLECs and other carriers to roll out service rapidly to new cities and to minimize their costs for equipment, real estate, including collocation space, and for environmental requirements.”); Rhythms at 14 (“[O]lder equipment with fewer functions may well require the same, if not more, space than its more efficient multi-functioned counterparts.”) Covad at 25 (“Rack-mountable equipment” is *by definition* built according to “an objective standard” that is prevalent in the industry, it “simply doesn’t take up excessive space” as the ILECs incorrectly contend).

Of course, incumbents could reasonably limit additional functionalities to telecommunications functions. As the Joint Commenters note, however, virtually all of the multifunctional equipment that has been the subject of disputes between ILECs and CLECs involve *only* telecommunications functions that are integrated with the transmission and switching functions that are indisputably “necessary” for interconnection or access to unbundled network elements.²¹ Joint Commenters at 31 (“Notably, the ‘additional’ functionalities being described herein are those the CLEC would have no reason to utilize if the equipment were not also being used for interconnection with the ILEC network or access to UNEs”); *see also* Qwest at 5 (“it is not our intention to support a rule which would permit a combination multiplexer and microwave oven that could be placed in collocation space and used to cook breakfast”). Indeed, as AT&T (at 63-65) showed and as many commenters agree, forcing CLECs to disable certain integrated functions would be a costly and burdensome process that would thwart competitive entry.²²

Finally, Verizon’s claim that equipment vendors would rush to offer single-use equipment in response to the “demand” for such equipment that would be created by a Commission rule prohibiting multi-use equipment is surely incorrect. As Nortel explains (at 5), such a rule would have the opposite effect, because “[s]uch restrictions would likely require

²¹ *See infra* at 26-28.

²² *See, e.g.,* Connectiv at 8-9 (“[a]rtificially ‘dis-integrating’ technology or forcing new carriers not to use available functionality in collocated products would create an enormous barrier to competition by CLECs”); *Supra* Telecom at 10-11 (absent ability “to collocate multi-function equipment, CLECs would have to purchase and [could be forced] install new equipment each time they were permitted to provide additional services.”); Joint Commenters at 30; ATG at 4 (“If the Commission were to limit the ability of CLECs to collocate next generation equipment that perform multiple functions, the Commission would be freezing the development of telecommunications technology and ensuring that CLECs will not be able to take advantage of further efficiencies that currently remain in the development stages.”).

increased research and development efforts because of the loss of potential economies of scope in order to design additional products or product variants.” Thus, contrary to Verizon’s claim, restricting CLECs to single-use equipment would so increase their costs and negatively impact their competitiveness that CLEC demand for collocated equipment would dramatically decrease, which in turn would further reduce the vendors’ incentives to develop such equipment in the first place. *See, e.g.*, Cisco at 10-11. If anything, Verizon’s claim is simply a candid admission that the incumbents seek nothing less than the Commission’s intervention in the development of technology in the equipment market in a way that systematically favors the incumbents.

C. Under These Standards, The Commission Has Ample Authority To Require Collocation Of Transmission, Switching and Surveillance Functionalities.

The commenters also overwhelmingly support the adoption of national rules specifying that incumbents must permit competitive LECs to collocate equipment that performs both transmission and switching functionalities, along with the associated surveillance functionality. Indeed, the commenters have provided extensive evidence that transmission and switching functionalities are in fact “necessary” for interconnection and access to unbundled network elements. Moreover, because of the incumbent LECs’ incentive and ability to use changing technology to delay and impede competition, AT&T supports the many commenters that urge the Commission to establish a rebuttable presumption that any equipment providing such functionalities is necessary for interconnection and access to network elements and therefore may be collocated by CLECs.²³

²³ *See, e.g.*, CompTel at 5 (rebuttable presumption); Rhythms at 12-13 (Commission’s “inquiry must focus first on the functions that CLECs must have at the ILEC premises for interconnection and access to unbundled network elements.”); Covad at 24 (The solution ultimately adopted

The commenters also broadly support national rules that, consistent with Commission precedent, base the presumptions relating to collocation on the *functionalities* to be collocated, rather than on the names of specific types of equipment. As Focal correctly states (at 9), “[t]he Commission should not tie the definition of ‘necessary’ to equipment in use today,” because “the Commission’s definition of ‘necessary’ must be able to be applied to changing technology.” Moreover, as Cisco points out (at 5), “[a]ny regulatory system that does not take such changes into account is destined to stifle innovation and severely hamper entry by new competitors by consigning them to antiquated level of technology.”²⁴ Therefore, to avoid inevitable disputes in this area, the Commission’s rules should focus on the collocation of functionalities rather than specific types of equipment.

1. Transmission Functions. There is overwhelming agreement that transmission functionalities, including all types of multiplexing equipment, can be collocated under the statute. Even Verizon concedes (at 7) that the statute requires it to permit collocation

“must be crafted so as to prevent ILECs from engaging in wasteful and costly case-by-case litigation” that currently hampers competition.).

²⁴ See also Qwest at 5-6 (“[t]he Commission should not try to anticipate every circumstance which may arise in the future; if technology or the market evolves in such a way that problems arise under the existing collocation rules, the Commission should revisit . . .”); Intraspan at 6-7 (retrospectively-fixed definition “cannot hope to anticipate the likely innovations and evolutions as we move to a fully digital communications network.”); Covad at 23 (noting ILECs’ opportunity to “engage in endless, case-by-case litigation of the ‘capabilities’ or ‘use’ of a particular piece of equipment in every state and over virtually every product model number.”); Focal at 11 (Because “[m]any CLECs have different network design and topology than the ILECs,” they “may require different types of equipment collocated in the ILEC premises,” and consequently the rule should focus on functionalities and equipment CLECs need to compete); ATG at 5 (“[A]s the Commission reviews the record in this proceeding, it should remain sensitive to the need for adopting rules that will permit CLECs to take full advantage of impending advances in telecommunications technology so that they may more efficiently provide competitive telecommunications services.”); Sprint at 5 (“[H]ow tenuous the various functions of a piece of multifunction equipment are to interconnection and UNE access may change in ways

of “multiplexers, concentration devices and [DSLAMs].”²⁵ As AT&T showed (at 27-30), the Commission has always regarded such functions as subject to collocation, and no commenter seriously disputes that Sections 251(c)(6) requires collocation of such transmission functions.²⁶

Absent collocation of such equipment, competitive entry would simply be impossible. As AT&T showed (at 3, 18-21), equipment performing transmission functions is “necessary,” under any definition of that term, for interconnection or access to unbundled network elements, because the only available alternative to collocating such equipment would be to deploy interoffice transport facilities that would be prohibitively expensive. Incumbent LECs typically deliver unbundled loops to the new entrant’s collocation cage at low transmission rates,

that no one can fully appreciate today.”); Sprint at 7 (advocating that Commission not “engage in definitional exercises” that “will shortly be rendered obsolete by technological change”).

²⁵ See also Joint Commenters at 28-29. As the commenters have repeatedly demonstrated, incumbents have sharply escalated their deployment of multi-function and next-generation advanced services equipment so rapidly that many incumbents predict that DSL penetration rates will increase from approximately 10% at the passage of the 1996 Act to over 80% within the next two to three years. Depriving CLECs of the ability to compete in the first several years of mass-deployment by incumbents would doom CLECs to a perpetual disadvantage and allow ILECs to seize increased monopoly power in the interim. See, e.g., Rhythms at 10-11 (due to “the ever changing nature of the network, constant evolution and consolidation of equipment to increase functionality and efficiency, and the burgeoning service innovations offered by providers, it is impossible to construct a comprehensive or static list of equipment necessary for interconnection and access to UNEs”).

²⁶ SBC contends (at 14-15) that the Commission’s recent order regarding Project Pronto provides that optical concentration devices are not “necessary” under the statute. SBC misreads the order. The Commission made clear that it was not making any findings in the Project Pronto order that would prejudice the collocation remand proceeding. *Second Memorandum Opinion and Order, In The Matter Of Ameritech Corp., Transferor And SBC Communications, Inc., Transferee For Consent to Transfer Control of Corporations Holding Commission Licenses and Lines Pursuant to Sections 214 and 310(d) of the Communications Act and Parts 5, 22, 24, 25, 63, 90, 95, and 101 of the Commission's Rules*, CC Docket No. 98-141, FCC 00-336 (rel. Sept. 8, 2000), ¶ 9 (emphasis added). It merely stated that OCDs “*may* not be strictly necessary for interconnection or access to unbundled network elements.” *Id.* ¶ 36 (emphasis added). However, in a corresponding footnote, the Commission recognized that this was an open issue and that it had “initiated a rulemaking to consider this and related issues.” *Id.* n.104 (internal citation omitted).

usually in an electrical, analog format. Thus, CLECs must employ a number of transmission functions, including termination, concentration, multiplexing, and signal conversion in order to interconnect the ILEC's facilities with the high capacity optical interoffice transport facilities CLECs must use to operate efficiently and competitively. Indeed, numerous commenters recognize that, absent collocation of such functions, CLECs would literally have to rely on copper pairs for interoffice transport, which would preclude entry.²⁷

Transmission functions are also "necessary" for "interconnection" or "access" to unbundled network elements. As many commenters note, CLECs would be precluded from using the features, functions, and capabilities of the unbundled loop that permit DSL services if they could not collocate DSLAMs in the central office. Thus, Covad (at 21) shows that "[f]or a DSL provider like Covad," collocation is necessary "because if [access to the UNE loop] were to take place [outside the central office], the copper loops would have to be extended and more complex and technically limiting cross-connects and interconnection would be necessary," which "would seriously degrade the variety and quality of service that Covad could offer. It's as simple as that."²⁸

²⁷ See, e.g., Corecomm at 28 (absent collocation, "CLEC would have to run lines from the ILEC Central Office to its own switch site at considerable cost"); Tachion at 5 ("it is plain that equipment should be deemed 'necessary' for interconnection to the network and access to unbundled network elements in any case where the CLEC would otherwise incur the costs of avoidable backhaul, because in such instances the barrier to competition would inevitably be high"); CompTel at 4 ("[t]he costs of establishing separate nodes would force the CLEC to ramp up services more slowly, limit geographic coverage, or raise retail rates," and "[i]n some cases it would be forced to abandon or severely limit its use of additional functionalities . . ."); Connectiv at 17; RCN at 14.

²⁸ See also Joint Commenters at 30-31 (unless DSLAM is close to the unbundled loop, "[i]n most instances this will require collocation or the CLEC will have to construct its own loop facilities"); Joint Commenters at 30 ("[A]s the Commission recognizes," a CLEC's "DSLAM

2. Switching Functionality. The commenters, including Qwest, also broadly support a rule requiring collocation of switching functionality. The incumbents, however, are largely silent on switching, with the exception of SBC, which simply states in a single paragraph that the Commission has previously said stand-alone switching equipment cannot be collocated. SBC at 14. This cursory claim does nothing to undermine the extensive factual showings made by AT&T and others that switching functionality is in fact “necessary” for interconnection and access to unbundled network elements.²⁹

First, packet switching functionality is “necessary” for interconnection and access to unbundled network elements. As AT&T showed (at 27-30), packet switches perform a number of critical *transmission* functions that enable a carrier to optimize its use of transport media. Packet switches process communications that have been structured as small cells, each of which contains “header” information that allows the switch to determine the destination of the packet. Because this information is available for each packet, and because end-to-end paths are software defined, the packet switch efficiently can place customer communications on a conductor based upon the nature and extent of demand for the use of a particular facility at any particular time. For these reasons, packet switches increase the efficiency of the carrier’s

cannot be located beyond a certain distance from the end user and the equipment must have direct access to the copper loop.”); *see also* *UNE Remand Order* ¶ 313.

²⁹ In all events, as Corecomm points out (at 22-23), the Commission “has never found – based upon record evidence – that switches do not perform interconnection or network access functions.” Indeed, as Covad notes (at 23-24), the Commission’s earlier statements with respect to switching are largely the product of “historical accident, a relic of the *Expanded Interconnection* docket where the Commission was explicitly not promoting the deployment of competitive, switched local services.” Moreover, when the Commission made those statements, switch technology was at an entirely different stage of development, and equipment containing switch functionality was typically very large.

transmission facilities based upon the way they intelligently multiplex communications onto the available capacity in those facilities.

Packet switch functionality thus facilitates a dramatic increase in the efficiency of a carrier's transmission bandwidth by integrating route selection functionality and the multiplexing technique known as statistical multiplexing. Indeed, it is increasingly the case that advances in transmission functionality (such as statistical multiplexing) cannot be deployed in isolation, but can be used *only* in conjunction with packet switch functionality. As Cisco explains (at 7), "manufacturers and service providers have favored multifunctional equipment [-- e.g., transmission combined with packet switch functions -- precisely because it offers capabilities that are most efficiently and effectively performed as an integrated set of functions," and as a result "most if not all of the functionalities being built into multifunctional equipment available today" in fact satisfy the "necessary" standard under Section 251(c)(6). Therefore, collocation of packet switch functions is "necessary" to make use of transmission functions that are indisputably necessary for interconnection and access to unbundled network elements.³⁰

Moreover, even if packet switch functions themselves were not deemed to be "necessary" for interconnection or unbundled network elements -- an inappropriate outcome in light of the assembled evidence -- such functions are nevertheless routinely integrated into a single piece of equipment with transmission functions that are unquestionably "necessary." Thus

³⁰ See Qwest at 13 (future technology integrates functions, which "makes the network more efficient by pushing the optical-type architecture outward on the network and saving transport costs by avoiding the need to backhaul traffic to Qwestlink sites"); Covad at 23 ("by distributing switching capability and functions to the periphery of the network, . . . transport bandwidth would be maximized"; switching, routing, multiplexing are distinctions without a difference); Corecomm at 23-24 ("[a]s the contemporary telecommunications market is increasingly characterized by packetized data traffic, there is no meaningful distinction between interconnection and switching functions").

precluding collocation of such packet switch functions would be unlawfully discriminatory for the reasons discussed above. As Tachion, a manufacturer, observes (at 2), “advances in integration and processing capabilities” have permitted it to design a product that combines switching, routing, transport, digital access cross connect system (“DACS”), signaling, and service creation functionality in a single standard central office rack.” *See also* Nortel at 2-3. Moreover, as Tachion states (at 2), “this set of functionality does not come from combining separate devices in a single chassis, but rather comprises a fully integrated design, from the ground up.” Critically, as Qwest shows (at 9-10), “[a] rule that would preclude CLECs from deploying any or all of the additional functions of such multi-functional equipment could place CLECs at a material competitive disadvantage by forcing them to backhaul traffic for switching and other functions, and in some cases require the purchase of duplicate equipment,” which would “as a practical matter disrupt services and competition because the failure to utilize all of the power of new equipment would artificially impose inefficiencies on some CLECs.”³¹ Moreover, as AT&T noted (at 19 n.7), the Commission’s decision in the *UNE Remand Order* not to require unbundling of packet switching was expressly premised on the Commission’s findings that new entrants were able to self-provide such functionality by using collocation arrangements. *UNE Remand Order* ¶¶ 313-17. Therefore, if the Commission were now to conclude that new entrants are *prohibited* from collocating such functions (as it should not), the Commission would

³¹ *See also* Connectiv at 8-9 (“[a]rtificially ‘dis-integrating’ technology or forcing new carriers not to use available functionality in collocated products would create an enormous barrier to competition by CLECs”); Joint Commenters at 32 (absent collocation of multi-function equipment, “ILECs will be capable of discriminating” against CLECs because “they will be able to install and use the most efficient technology and equipment” that would be unavailable to CLECs.).

have to reconsider its decision not to order unbundling of packet switching under the “impairment” standard of Section 251(d)(2).³²

The Commission should also require collocation of circuit switch functionality. First, as a number of commenters note, circuit switch functionality can be integrated with transmission functions in relatively small equipment that fits within a standard collocation cage. Just as with packet switching, circuit switch equipment may perform multiplexing and concentration functions that facilitate a competitive LEC’s access to unbundled loops, as well as provide a switching functionality between customers served from the same central office. As AT&T showed (at 27), a single RSM can replace multiple DLCs, and depending on the size of the footprint served from that central office, the RSM is likely to be no bigger, and perhaps even *smaller*, than the multiple DLCs it is replacing. Therefore, as many commenters recognize, an incumbent LEC’s prohibition on collocation of equipment containing circuit switch functionality would be discriminatory and anticompetitive.³³

Circuit switch functionality, like packet switch functionality, also can be “necessary” for interconnection or access to unbundled network elements in certain circumstances. Indeed, collocation of circuit switching may be critical to a carrier’s decision to serve more rural and more heavily residential offices where calling is more heavily concentrated within the wire center, because the alternative of establishing backhaul facilities is prohibitively

³² RCN at 12 (New equipment and services such as DSL, line sharing, and next-generation DLC systems are increasingly essential to CLECs’ ability to compete, giving incumbent LECs “substantial opportunity . . . to exclude competition with network design choices that favor themselves or their advanced services affiliate.”).

³³ RCN at 14 (Allowing incumbents to “[d]eny[] CLECs the right to collocate advanced services equipment would effectively thwart CLEC’s ability to compete.”); Joint Commenters at 32

expensive. Likewise, in a situation where a CLEC is seeking to compete in an urban setting against an ILEC serving the customer with Centrex service over short loops, the only practical means to compete may be through deployment of circuit switching in collocation. Finally, certain large customers may require that their locations not be broadly vulnerable to a switch failure that might occur if a CLEC was employing a single centralized point of switching. In such cases, the collocation of circuit switching in ILEC offices may be the only alternative available through which a CLEC can meet that customer's needs. *See AT&T at 15.*

Of course, circuit switching functionality would not *always* be subject to collocation. For example, no party has suggested that a CLEC can collocate a full-blown 5ESS switch. Rather, circuit switch functionality may be collocated only when such collocation satisfies the statutory standards. In other words, switch functionality delivered through circuit-switched technology may be collocated: (1) when "necessary" to accomplish a material increase in the efficiency of the transmission functions handling the traffic originating and terminating from that central office, or (2) when the circuit switch function is integrated as an additional functionality in equipment that is otherwise collocable and fits within a standard collocation space (in which case precluding collocation would be unjust, unreasonable, and discriminatory). Indeed, distinguishing switch functions for purposes of collocation solely on the basis of the technology used – *i.e.*, packet switch vs. circuit switch – would place the Commission in the untenable position of picking technological winners and losers. The Commission should continue to allow the market to determine the appropriate direction of technological development.

("ILECs will be given an enhanced, if not inherent, ability to discriminate against CLECs" simply by denying them access to the most cost-effective technologies and equipment).

3. Cross-Connects. The commenters also agree that CLEC-to-CLEC cross-connects should be permitted.³⁴ Although the incumbent LECs, and in particular SBC, disagree, none of the incumbents can rebut the commenters' showings that the antidiscrimination requirements of Section 251(c)(3) require incumbents to allow cross-connects as a "just and reasonable" term of collocation. Similarly, the incumbent LECs do not – and, indeed, cannot – refute the substantial showings made by AT&T and others that connections outside the central office are so expensive as to make certain services prohibitively expensive, and are therefore necessary for access to unbundled network elements in the context of line sharing.³⁵

As AT&T has previously demonstrated, the statute provides two independent grounds for requiring cross-connects. *First*, the Commission has ample authority to require incumbent LECs to allow cross-connects as a just, reasonable, and nondiscriminatory term of

³⁴ See, e.g., Qwest at 16 ("Qwest does not believe that it would be just and reasonable to deny a collocator, who otherwise meets the 'necessary' standard, additional incidental (and reasonable) uses of the collocation space, such as cross-connects to other CLECs that are otherwise lawfully collocated in that central office."); Corecomm at 29 ("Denial of cross-connection would violate the requirement that ILECs provide collocation on a nondiscriminatory basis, because ILECs can and typically do connect with a collocating CLEC at the ILEC's central office, but another CLEC could not. Of particular concern is that the inability to directly cross-connect with other collocated CLECs would effectively thwart CLEC advanced optical networking initiatives that use dark fiber capacity leased from other carriers because adequate optical cross-connect services from ILECs are either unavailable and/or would degrade the quality of service that CLECs are able to provide in comparison to direct cross-connection between CLECs."); Lightbonding at 3 ("The inability of CLECs to collocate on ILEC premises for the purpose of cross-connecting with other CLECs will effectively prohibit many CLECs from having access to advanced optical network and transport services currently under development."); Rhythms at 27-30; Connectiv at 19-20; RCN at 15-16; and see GSA at 12 ("GSA urges the Commission to find that incumbent LECs should allow multiple collocators to interconnect directly with each other within their central offices, but incumbent LECs should not be generally required to provide interconnections through their own facilities or equipment.").

³⁵ NorthPoint at 12 ("Without the ability to cross-connect its collocated equipment to a CTP in [certain] offices, NorthPoint would not be able to serve ISPs with end user customers in those offices."); Rhythms at 28 (Absent cross-connects "efficient and effective interconnection would be precluded"); RCN at 16 ("[C]ross-connection is vital to CLECs' ability to compete").

collocation.³⁶ The incumbents cannot seriously dispute that their duty to provide collocation carries with it the ancillary obligation that such collocation be provided on just, reasonable, and nondiscriminatory terms.³⁷ This nondiscrimination requirement necessarily encompasses cross-connects, and an incumbent's attempt to deny that right would be inherently discriminatory and unreasonable. Indeed, if the incumbent can deny CLECs the opportunity to cross-connect, the incumbent would be the only LEC permitted to interconnect with all other CLECs within the central office.

Second, cross-connects are increasingly "necessary" for access to unbundled network elements. As line-splitting arrangements between LECs become more common, it becomes increasingly important for CLECs providing distinct services to have access to the features, functionalities, and capabilities of the unbundled loop by means of line-sharing.³⁸ Line-

³⁶ See *Local Competition Order* ¶ 594; cf. *Collocation Order* ¶ 34. See also, e.g., NorthPoint at 9-10 (explaining authority and rationale for crossconnect requirement); LightBonding at 5 ("[T]he structure, plain language, and purpose of the Act make clear that section 251(c)(6) requires that incumbents allow competitive providers to interconnect with each other directly while collocated in the ILEC facilities."); Broad authority to prevent discrimination: Connectivity at 4 ("[T]he courts have not only upheld this Commission's broad authority to define the scope of unreasonable discrimination under Section 202(a) of [the Act], but they have affirmed this Commission's authority to fashion remedies for such discrimination . . . through the Commission's authority to prescribe just and reasonable terms and conditions of service.").

³⁷ For example, the usefulness of collocation arrangements would be substantially impaired absent an implied easement for CLEC workers to enter the central office to maintain their collocated equipment. See, e.g., LightBonding at 6 ("Had Congress intended to restrict the scope of permissible collocation required in the ILECs' premises under section 251(c), it would have also expressly limited the duty it had already created in Section 251(a)(1) to interconnect both directly and indirectly."); Covad at 26 ("Commission must conclude that a collocating carrier is permitted, pursuant to section 251(c)(6), to interconnect with another collocating carrier, in the central office, by cross-connect or any other technically feasible means of that carrier's choice."); Rhythms at 28 ("Section 251(c)(6)'s obligation . . . extends to carrier-to-carrier cross connects."); NorthPoint at 11 (Collocation right would be rendered "meaningless without the ability to connect [certain collocated equipment]" by means of cross-connects.).

³⁸ See generally Third Report and Order, *Deployment of Wireline Service Offering Advanced Telecommunications Capability*, CC Docket No. 98-147 and Fourth Report and Order,

line splitting, however, requires the two LECs to split and route the traffic between separate networks.³⁹ As the commenters show, absent the ability to interconnect within the central office, two CLECs engaged in line-splitting would be forced to extend their lines and interconnect at some other location (or be limited to interconnecting only with the incumbent LEC).⁴⁰ The cost of interconnection outside the central office would effectively destroy the ability of the LECs to share the lines. Accordingly, cross-connects within the incumbent's premises are "necessary" for access to the full features and capabilities of the unbundled loop.

Finally, industry practice clearly demonstrates that CLEC-to-CLEC cross-connects are both practically necessary and feasible. For example, third party "collocation hotels" (which are under no legal obligation to do so) provide cross-connects between CLECs as an important "value-added" service.⁴¹ This availability of cross-connects refutes any claims of

Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Docket No. 96-98, 14 FCC Rcd. 20912 (1999) ("*Line Sharing Order*").

³⁹ In fact, it is not uncommon for a single CLEC to require interconnection between its *own* non-contiguous collocation spaces for the same reason. See *NorthPoint* at 13 (necessary for a single CLEC to interconnect between its own non-contiguous collocation spaces within same central office). And, as noted by Rhythms at 28, it "uses the facilities of *several* CLECs in assembling its own competitive DSL network," which necessitates cross-connects.

⁴⁰ Rhythms at 29 ("If CLECs cannot cross connect with other CLECs in the ILEC premises, they do not have a nondiscriminatory ability to cross-connect.").

⁴¹ Third-party collocators Switch & Data Facilities Co., AccessColo, and Colo.com are just three examples of collocators that find it not only feasible, but profitable, to themselves provide or, in some cases, to allow self-provisioning of CLECs to cross-connects at their collocation facilities. See http://www.accesscolo.com/solutions/serv_spex/body.html (advertising provision of cross-connect "Connection to carrier(s) of customer's choice and services offered by providers"); http://www.colo.com/english/solution/service_specs.htm ("Cross-connects are available in a variety of media."); <http://www.switchfacilities.com/colocation.html> ("By pre-running conduit, securing access rights, and providing key carriers with space for their network interface equipment inside our facilities, we allow customers and carriers to meet with the lowest possible marginal cost - and without cooling, power or security worries.").

impracticality and infeasibility.⁴² Moreover, as noted by Rhythms, forcing CLECs to interconnect indirectly “would be inefficient and require unnecessary installation of duplicative facilities and equipment, and in many cases would force competitors to use *more not less* [space in] ILEC facilities.”⁴³

4. Dark Fiber and Transport Provided By Non-Carriers. SBC (at 17-18)

argues incorrectly that the Commission should not permit non-carrier providers of dark fiber and interoffice transport to collocate in incumbents’ central offices. Specifically, SBC claims that one must be a telecommunications carrier in order to obtain collocation under Section 251(c)(6), but the plain language of the Act says otherwise. Section 251(c)(6) says simply that incumbents must permit collocation of “equipment necessary for interconnection or access to UNEs” – the Act does not specify that a collocator must be a telecommunications carrier. While only telecommunications carriers may obtain interconnection under Section 251(c)(2) and access to unbundled network elements under Section 251(c)(3), there is no reason why non-carrier providers of inputs to such carriers may not collocate “equipment necessary for interconnection or access to UNEs” just as carriers do.⁴⁴

⁴² Moreover, as various commenters note, it is highly improbable that CLEC-to-CLEC cross-connects would “subject [ILECs] to any increased burdens since central offices are by their very nature designed for [accommodation of] running cabling and performing interconnection.” Connectiv at 24.

⁴³ See Rhythms at 31 (explaining additional and unnecessary costs.); Joint Commenters at 33 (“[I]f CLECs, unlike ILECs, are required to incur [substantial] additional and unnecessary equipment, space, and transport costs” in order to interconnect with ILECs, “they will be denied [any] meaningful opportunity to compete.”).

⁴⁴ The *Local Competition Order* (§ 611) is not to the contrary. That order did not address the question whether a non-carrier that provide inputs to carriers may collocate its equipment. Rather, the Commission merely held that it would continue its pre-existing *Expanded Interconnection* regime in place, on the grounds that the *Expanded Interconnection* regime was of broader scope (*i.e.*, enhanced service providers were permit to obtain collocation under the

II. COMPETITIVE LECs ARE ENTITLED TO ACCESS THE FULL FEATURES, FUNCTIONS, AND CAPABILITIES OF THE LOOP, REGARDLESS OF THE LOOP ARCHITECTURE DEPLOYED BY AN INCUMBENT LEC.

The traditional loop plant is clearly changing, as incumbent LECs are deploying new loop technologies that enable them to utilize more efficient loop architectures. As discussed in Part A, however, the comments demonstrate that implementation of next-generation loop architecture does not change any of the fundamental legal and policy principles that have guided the Commission's definition of the local loop network element. Likewise, the new architecture does not diminish (and indeed, heightens) the competitive LECs' need for access to the entire loop. Part B below states that, contrary to some incumbent LECs' claims, preservation and enforcement of unbundling requirements will not discourage incumbent LEC investment in next-generation network architectures. Part C shows that the comments also clearly support AT&T's showing that no type of remote collocation -- whether physical, adjacent, or virtual -- can support broad-based competition or provide a viable basis for an exception to the incumbent LECs' existing loop unbundling obligations. Part C also shows that the commenters agree with AT&T that neither access to spare copper nor an incumbent LEC's offering of a "broadband service" is a viable substitute for competitive LEC access to the entire loop, especially for the purpose of delivering a full array of telecommunications services to residential consumers.

The comments further demonstrate that if the Commission fails to adopt rules that recognize competitive LECs' continued need for access to the entire loop, the result will be drastically reduced prospects for competition for all telecommunications services, as discussed in

Expanded Interconnection regime, while Section 251(c)(6) collocation is limited to the operations of telecommunications carriers). While collocated equipment can only be used for a telecommunications carrier's interconnection or access to UNEs, as the *Local Competition Order* indicates, it does not follow that the carrier is the only party that can obtain collocation of that equipment.

Part D. Finally, Part E explains that the Commission's rules should be adjusted to recognize that the DSLAM's pure multiplexing functionality -- especially when deployed in a remote terminal loop architecture -- is part of the local loop element.

Incumbent LECs are deploying new loop technologies and architectures that improve service and network efficiency by incorporating much greater use of fiber; introducing splitting and additional signal conversion, encoding, concentration, and multiplexing functions at remote terminals; and adding decoding and demultiplexing at the central office and elsewhere in incumbent LECs' networks.⁴⁵ However, as AT&T and other commenters demonstrate, *nothing* in this new loop architecture changes the essential fact that the connection from the customer's premises to the central office is still a "loop."⁴⁶ The Commission's analysis in this proceeding therefore must adhere to the fundamental principles established in its prior decisions that define the loop element and preserve competitive access to all features, functions, and capabilities of the loop unbundled network element:

- *First*, the Commission has clearly and repeatedly held that the essential function of the loop is to provide transmission functionality between a customer's premises and an incumbent LEC's central office, not between the customer's premises and an intermediate point such as a remote terminal.
- *Second*, the Commission has consistently and properly held that the loop functions as a transmission path and that the availability of the unbundled loop functionality is not limited to use for particular services or to the capabilities of specific technologies.

The Commission must view these principles -- and the statutory bedrock in which they are grounded -- as the paramount reasons that competitive LECs need, and are entitled to, continued

⁴⁵ See AT&T at 37-43; Declaration of Joseph P. Riolo (Riolo Decl.) §§ 3A, 3B.

access to the entire loop element. Indeed, failure to adhere to these precedents, or a finding that competitive LECs must use remote collocation when an incumbent deploys next-generation DLC in its outside plant, would ignore the statutory obligations Congress imposed on incumbent LECs and would be the death knell for mass-market competition, especially for advanced services.

In this regard, the Commission must not allow the incumbent LECs' obfuscations to cloud the pivotal competitive fact: if competitive LECs cannot access all of the communications signals sent over their customers' individual loops, competition for both local voice and data services will be stifled. The Commission's earlier decision declining to unbundle packet switching -- even in the face of a finding of "impairment"⁴⁷ -- relies on the premise that competitive LECs will have efficient and meaningful access to their customers' telecommunications signals at the incumbent LEC central office.⁴⁸ It is this access that AT&T and other competitive LECs seek to preserve here. Ironically, denying competitors unbundled access to the entire next-generation loop would, under the analysis in the Commission's *UNE Remand Order*, require full unbundling of packet-switching. Without access to the entire loop in a next-generation network -- which consists of copper distribution, the fiber feeder facilities running from the remote terminal to the central office, and all associated loop electronics at the remote terminal and central office -- competitors will not have efficient and meaningful access to the signals necessary to offer competitive services. This, in turn, would require a complete reversal of the *UNE Remand Order*'s analysis of packet-switching and the full unbundling of the packet switching element.

⁴⁶ See AT&T at 44-49; see also @Link at 2-5; DSLnet at 6-12; Focal at 26-29; Rhythms at 75-81.

⁴⁷ The Commission found packet switching met the "impairment" standard, at least for most customers. See *UNE Remand Order* ¶ 306.

A. The Act and the Commission's Prior Decisions Require That Competitors Continue to Have Access to the Entire Unbundled Loop.

Except for the incumbent LECs, the commenters support AT&T's showing that the legal principles defining the unbundled loop element are straightforward.⁴⁹ Nevertheless, the incumbent LECs misread the law and attempt to confuse the analysis in an effort to block competitive LECs' ability to access the incumbent LECs' next-generation loop plant. Accordingly, it is imperative that the Commission reiterate the fundamental principles that have consistently guided its definition of the unbundled loop element. These principles fully support the competitive LECs' statutory right to access to the *entire* loop, regardless of the loop architecture an incumbent LEC deploys.

In the 1996 Act, Congress required incumbent LECs to provide requesting carriers with nondiscriminatory access to "a facility or equipment used in the provision of a telecommunications service," including all "features, functions, and capabilities that are provided by means of such facility or equipment."⁵⁰ Guided by this statutory mandate, the Commission recognized that granting competitive LECs unbundled access to the local loop was paramount for the future of local competition, finding that "under any reasonable interpretation of the

⁴⁸ See *UNE Remand Order* ¶¶ 307, 313.

⁴⁹ See AT&T at 44-50; @Link at 2-5; Conectiv at 29-33; Corecomm at 40-42; CTSI at 29-35; DSLnet at 6-8; Focal at 26-29; Mpower at 40-42; Rhythms at 75-81; Telergy at 44-45.

⁵⁰ 47 U.S.C. § 151(29) (defining a "network element"); 47 U.S.C. § 251(c)(3) (discussing the duty of incumbent LECs to provide unbundled access to network elements); see also *Local Competition Order* ¶ 258 ("[w]e adopt the concept of unbundled elements as physical facilities of the network, together with the features, functions, and capabilities associated with those facilities"); *UNE Remand Order* ¶ 175 ("[t]he definition of a network element is not limited to facilities, but includes features, functions, and capabilities as well").

‘necessary’ and ‘impair’ standards of section 251(d)(2), loops would be subject to the section 251(c)(3) unbundling obligations.”⁵¹

The Commission has repeatedly recognized that there are two essential principles that lie at the heart of the definition of the unbundled loop element:

- *First*, the essential function of the loop is to provide *transmission functionality* needed for a customer to send and receive information between his or her location and the network of the service provider.⁵²
- *Second*, and equally important, in order to support full-fledged competition, the local loop, as a transmission path, must be both service and technology neutral and must “apply to new as well as current technologies.”⁵³

The law and its governing principles can be further distilled into a single, simple statement:

Competitive LECs are entitled to access an unbundled loop element that consists of all features, functions, and capabilities that provide transmission functionality between a customer's premises and the central office, regardless of the technologies used to provide, or the services offered over, such facilities.

Despite the incumbent LECs’ attempts to confuse the issue, the straightforward analysis described above points the way for the appropriate treatment of next-generation loop

⁵¹ *UNE Remand Order* ¶ 163; *Local Competition Order* ¶¶ 377-378 (providing access to unbundled local loops to competitive LECs is “critical to encouraging market entry,” because “preventing access to unbundled loops would either discourage a potential competitor from entering the market, ... denying those consumers the benefits of competition, or cause the competitor to construct unnecessarily duplicative facilities, thereby misallocating societal resources”).

⁵² See 47 C.F.R. § 51.319(a) (“[t]he local loop network element is defined as a *transmission facility* between a distribution frame (or its equivalent) in an incumbent LEC central office and an end-user customer premises”) (emphasis added); *Local Competition Order* ¶ 380 (“[t]he local loop element should be defined as a *transmission facility*”) (emphasis added); see also *Line Sharing Order* ¶ 18 (competitive carriers “may access unbundled loop functionalities, such as non-voiceband transmission frequencies”).

⁵³ See *UNE Remand Order* ¶ 167 (emphasis added); *Local Competition Order* ¶ 292 (“section 251(c)(3) requires incumbent LECs to provide requesting carriers with all of the functionalities of a particular element, so that requesting carriers can provide *any telecommunications services* that can be offered by means of the element”) (emphasis added).

technologies. Nothing about next-generation loop architecture changes the basic characteristics or functionality of the loop element. Nor does that architecture affect competitive LECs' right (or their compelling need) to access the entire loop as an unbundled element at the central office. As the Commission has properly held: "[u]sing the loop to get to the customer is fundamental to competition."⁵⁴ The incumbent LECs' comments do not support any contrary finding.

For example, SBC attempts to convince the Commission that the service neutrality principle does not exist. Specifically, SBC erroneously suggests that competitive LEC access to a loop can be limited to only those instances where the underlying transmission facility is used to provision *voice* services.⁵⁵ But both the Act and the Commission's implementing rules and orders show that SBC is flatly wrong as a matter of law.

Neither the Act nor the Commission's discussions of unbundling of the loop network element make any distinction between the transmission functionality used to provide advanced data services and voice services. Indeed, the Commission has unequivocally held that the loop, as a transmission path, is service-neutral, finding, as a matter of fact and law, that there is "*no basis* for placing a restriction on what services a carrier may offer using the loop network

⁵⁴ *Line Sharing Order* ¶ 30; *see also UNE Remand Order* ¶ 171 (defining the unbundled loop element in such a way as to "ensure that the competitor will be able to gain access to the entire loop") (emphasis added); *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, *Memorandum Opinion and Order, and Notice of Proposed Rulemaking*, FCC 98-188, ¶ 54 (rel. Aug. 7 1998) ("*Advanced Services Order*") ¶ 54 ("[t]he incumbent LECs' obligation to provide requesting carriers with fully functional conditioned loops extends to loops provisioned through remote concentration devices such as digital loop carriers (DLC)").

⁵⁵ *See* SBC at 59 ("[c]arriers are fully able to provide *voice service* as long as they have access to unbundled loops, which they do. . . CLECs can use the NGDLC architecture to provide *voice service*") (emphasis added). BellSouth makes a similar implication. *See* BellSouth 5th NPRM Comments at 13 (claiming that the Commission's decision to unbundle incumbent LEC loops cannot support UNE treatment of advanced services loops).

element.”⁵⁶ Thus, there is no restriction on the type of service a carrier may provide through the use of an unbundled loop, except that the service must be a telecommunications service.⁵⁷ Both voice and DSL services are indisputably “telecommunications services” and thus are covered by section 251(c)(3).⁵⁸ Accordingly, competitive LECs are entitled to access an entire unbundled loop, irrespective of the telecommunications service that a carrier wishes to provide, and regardless of the underlying loop architecture the incumbent LEC uses to provide the loop functionality.

⁵⁶ *UNE Remand Order* ¶ 177. BellSouth’s comments notwithstanding (*see* BellSouth 5th NPRM Comments at 15), the Commission’s decision not to unbundle packet switching does not mean that the Commission chose not to unbundle the basic *transmission functionality* necessary to offer advanced services. Indeed, the Commission’s decisions to designate the high frequency portion of the loop spectrum as a separate unbundled network element and to require incumbent LECs to provide xDSL-capable loops are two recent examples where incumbent LECs must provide the underlying transmission functionality of the loop to competitive LECs for the provision of advanced services. *See Line Sharing Order* ¶ 18 (“carriers may access unbundled loop functionalities, such as *non-voiceband transmission frequencies*, separate from other loop functions, they are also ‘entitled,’ at their option, to exclusive use of the entire unbundled loop facility”) (emphasis added); *UNE Remand Order* ¶ 190 (“[w]ithout access to these [conditioned] loops, competitors would be at a significant disadvantage, and the incumbent LEC, rather than the marketplace, would dictate the pace of the deployment of advanced services”).

⁵⁷ *See UNE Remand Order* ¶ 177; *Local Competition Order* ¶ 292 (interpreting 251(c)(3) to bar “incumbent LECs from imposing limitations, restrictions, or requirements on requests for, or the sale or use of, unbundled elements that would impair the ability of requesting carriers to offer telecommunications services *in the manner they intend*”) (emphasis added); *see also* 47 C.F.R. § 51.307(c).

⁵⁸ *See Advanced Services Order* ¶ 11 (“all incumbent LECs must provide requesting telecommunications carriers with unbundled loops capable of transporting high-speed digital signals, and must offer unbundled access to the equipment used in the provision of advanced services, subject to considerations of technical feasibility and the provisions of section 251(d)(2)”). The Commission recently reiterated this point, noting that “section 251(c)(3) permits access to those facilities not just for the provision of ‘telephone exchange service’ or ‘exchange access,’ but more broadly for the provision of a ‘telecommunications service,’ a category that ... includes the xDSL-based services.” FCC Brief for Respondents at 21, *WorldCom, Inc., et al. v. FCC*, No. 00-1002 (D.C. Cir. filed Nov. 2, 2000) (FCC Appellate Brief).

This is a critical time in the development of competition for advanced services, especially as the incumbent LECs begin rapidly to deploy next-generation loop technology.⁵⁹ The addition of next-generation electronics in the incumbent LEC's loop plant enables greater bandwidth to be transmitted between the customer's premises and the central office, but it does *not* change the loop's basic function of supplying transmission between the customer premises and the incumbent LEC's central office. And the central office remains the place where competitive LECs can practically and economically obtain access to their customers' telecommunications transmissions so that they can provide the telecommunications services of their choosing.⁶⁰

As AT&T discussed in detail in its comments, next-generation loop electronics, such as line cards with DSLAM functionality and splitters: (i) determine how much information a customer can transmit/receive per unit of time; (ii) control communications with the service provider's network; and (iii) determine the efficiency (and therefore the cost) of facility use.⁶¹ In sum, the next-generation architecture enhances the transmission functionality of the loop and therefore is necessarily incorporated within the functionality of the unbundled loop network element itself.⁶² Indeed, as Verizon readily admits, the electronics associated with the next-

⁵⁹ See Morgan Stanley Dean Witter Industry Overview, *Telecom-Wireline: DSL. . . It's Going Well* (Nov. 7, 2000) ("*Morgan Stanley DSL Report*") ("[w]e expect Q4 [2000] to show a dramatic acceleration in DSL deployment. We estimate 704,000 net adds by the big four, twice the installs of any previous quarter, and up 56% sequentially").

⁶⁰ See AT&T at 46; Riolo Decl. ¶¶ 42-45; see also @Link at 2-4; CompTel at 13; Conectiv at 29-30; Corecomm at 40-42; Mpower at 40-42; Rhythms at 66-81.

⁶¹ AT&T at 44-47; Riolo Decl. ¶¶ 48-64.

⁶² See *UNE Remand Order* ¶ 175 ("[b]ecause excluding such equipment from the definition of the loop would limit the functionality of the loop, we include the attached electronics ... within the loop definition").

generation architecture “*simply provide[] a transmission channel* to facilitate delivery of specific services to the end user.”⁶³

The comments of both incumbent LECs and competitive LECs provide strong support for the fact that next-generation loops fall squarely within the Commission’s definition of the loop network element. Indeed, BellSouth explicitly states that the incumbent LECs are deploying the next-generation architecture to create “*what is in essence a new loop network*.”⁶⁴ The competitive LEC commenters also demonstrate that next-generation architecture does not change the loop’s essential functionality as a transmission pathway, nor does it reduce the critical competitive need to assure that such architecture is included within the definition of the loop element.⁶⁵

In addition, commenters generally agree with AT&T⁶⁶ that the electronics associated with the next-generation loop architecture should -- indeed must -- be considered part of the loop. Specifically, the commenters explain that line cards with DSLAM functionality and Optical Concentration Devices (OCDs) perform transmission-oriented functions when placed in next-generation loop architecture (*i.e.*, when transmission electronics are placed in the remote terminal that must work in conjunction with central office-deployed electronics).⁶⁷ For example,

⁶³ Verizon at 35 (emphasis added).

⁶⁴ BellSouth 5th NPRM Comments at 21 (emphasis added).

⁶⁵ See, e.g., AT&T at 44-50; Rhythms at 78-81 (“[n]ot only does the entire transmission facility between the central office and the end user remain a loop in the NGDLC network, the Commission has acknowledged that loops served over digital loop carrier can and should be unbundled as a single UNE”); see also @Link at 5; Conectiv at 30-31; CTSI at 31-33; DSLnet at 7-9; Focal at 27-29.

⁶⁶ AT&T at 56-64.

⁶⁷ See, e.g., DSLnet at 7-11; WorldCom at 9-10; @Link Networks at 5-7; Cisco at 8-10; Alcatel at 6-7, 12-13.